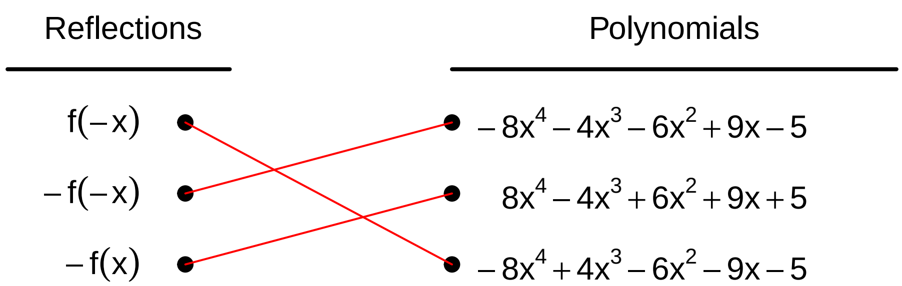
Name: Date:

Exam: Function Reflections (Solution version 16)

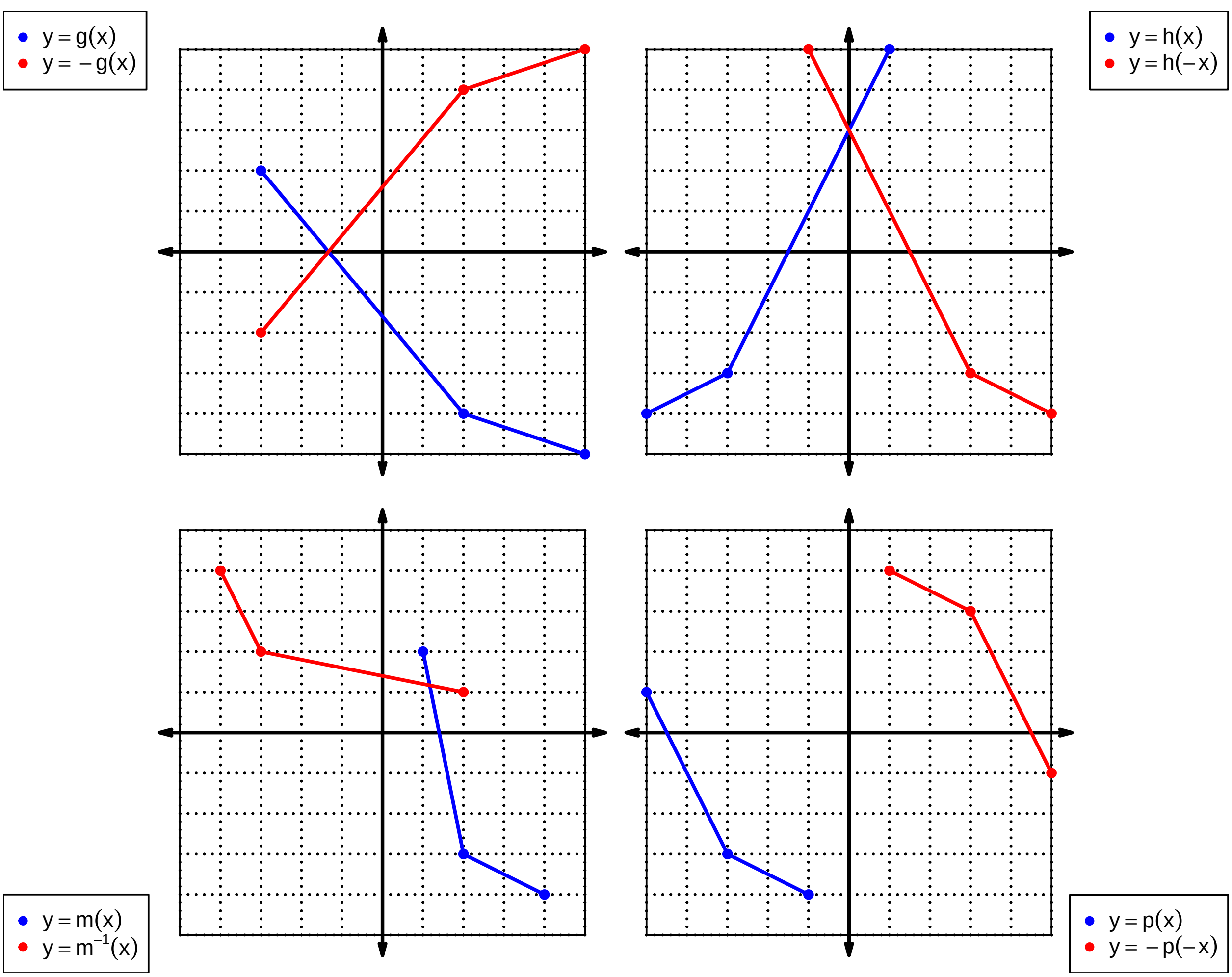
1. Let function f be defined by the polynomial below:

$$f(x) \;=\; 8x^4 + 4x^3 + 6x^2 - 9x + 5$$

Draw lines that match each function reflection with its polynomial:



2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f, g, and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	8	8	5
2	1	9	6
3	5	2	1
4	9	3	7
5	2	4	4
6	4	1	9
7	6	5	2
8	7	6	3
9	3	7	8

3. Evaluate $h(3)$.

$$h(3) = 1$$

4. Evaluate $f^{-1}(4)$.

$$f^{-1}(4) = 6$$

5. By filling more rows of the table, it is possible to make function f **even**. If that were done, what would be the value of $f(-7)$?

If function f is even, then

$$f(-7) = 6$$

6. By filling more rows of the table, it is possible to make function g **odd**. If that were done, what would be the value of $g(-5)$?

If function g is odd, then

$$g(-5) = -4$$

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7. A function, f, is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g, is **odd** if $g(x) = -g(-x)$ for all x in the domain.
   Let polynomial p be defined with the following equation:

$$p(x) = -x^3 + x$$

   a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = -(-x)^3 + (-x)$$
$$p(-x) = x^3 - x$$

   b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -\left(x^3 - x\right)$$
$$-p(-x) = -x^3 + x$$

   c. Is polynomial p even, odd, or neither?

   odd

   d. Explain how you know the answer to part c.

   We see that $p(x) = -p(-x)$ for all x because $p(x)$ and $-p(-x)$ are equivalent polynomials. Thus function p satisfies the criterion for being an odd function.

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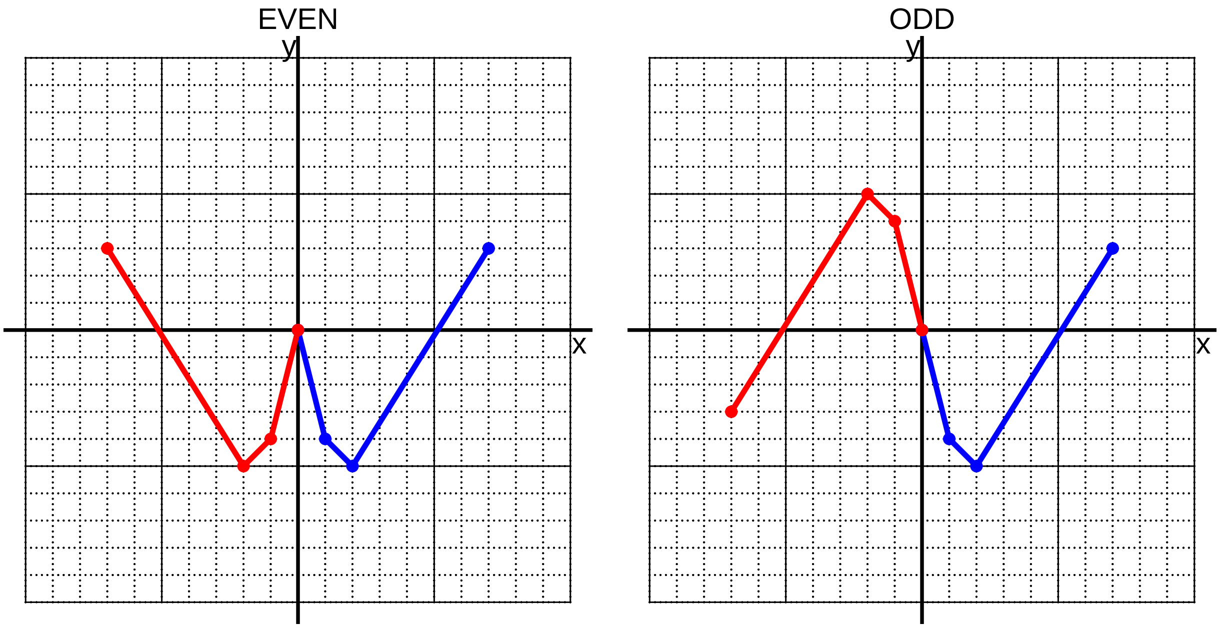
8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = 5(x-9)$$

a. Evaluate $f(23)$.

step 1: subtract 9
step 2: multiply by 5

$$f(23) = 5((23)-9)$$
$$f(23) = 70$$

b. Evaluate $f^{-1}(25)$.

step 1: divide by 5
step 2: add 9

$$f^{-1}(x) = \frac{x}{5} + 9$$
$$f^{-1}(25) = \frac{(25)}{5} + 9$$
$$f^{-1}(25) = 14$$

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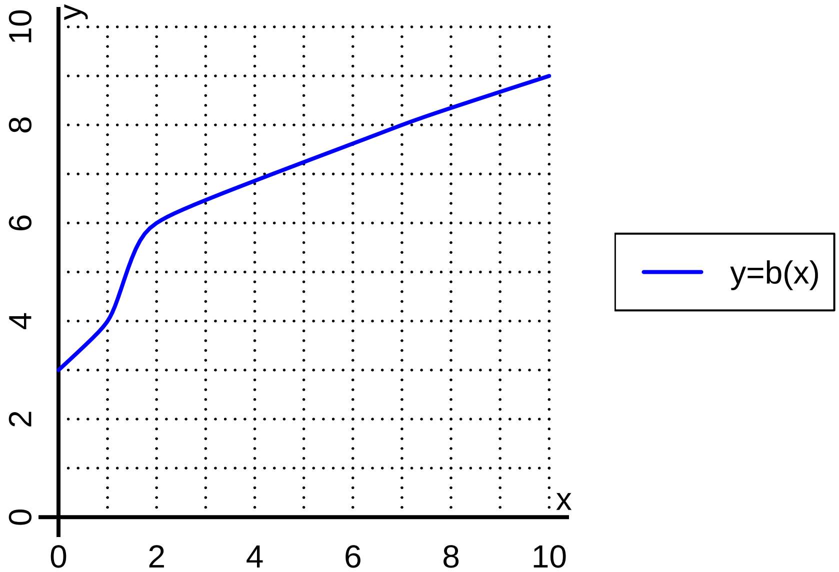
10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(7)$.

$$b(7) \ = \ 8$$

b. Evaluate $b^{-1}(6)$.

$$b^{-1}(6) \ = \ 2$$

Exam: Function Reflections (Solution version 16)

11. Function f is defined by the table below.

    a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-9	9	-9	9
-1	7	-7	7	-7
0	0	0	0	0
1	7	-7	7	-7
2	-9	9	-9	9

b. Is function f even, odd, or neither?

even

c. How do you know the answer to part b?

Function f is even because column $f(-x)$ matches column $f(x)$ exactly.